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EXAMINER	
PURINTON, BROOKE J	
ART UNIT	PAPER NUMBER
2881	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/562,211	BIJVOET ET AL.	
	Examiner	Art Unit	
	Brooke Purinton	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12/23/2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

"wherein the support is arranged to subject, at least when the support is accelerated, a first side of the patterning device to a clamping force, and wherein the support is associated with a clamping device which is arranged to subject a second side of the patterning device, *extending in a plane that is non-coinciding with the first side, to an additional clamping force, at least when the support is accelerated*" is confusing. The first side is non-coinciding with the second side of the patterning device? What does that mean? That they are parallel? And how does a side extend into a plane?

Claims 12 and 35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

"the clamping device comprises at least one mass which accelerates differently with respect to an acceleration of the support, each mass thereby capable of generating/negating a force that is transmissible for exerting the at least one second force" is unclear. It is not explained in the specification how one mass can accelerate differently from the acceleration of the support (which all the masses shown are attached to in the applicants figures) and still generate a force that is transmissible.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7, 10, 16,17, 21-23, 24-30, and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Takeshi Sato (JP 11040657A)

Regarding Claim 1, Sato teaches a lithographic apparatus (Figure 1) comprising:
an illumination system configured to condition a radiation beam (Figure 1, part 2);
a support constructed to support a patterning device (Figure 1, part 4 supports part 3), the patterning device being constructed and arranged to impart the radiation beam with a pattern in its cross-section to form a patterned radiation beam ("reticle" abstract), wherein the support is arranged to subject, at least when the support is accelerated, a first side of the patterning device to at least one first force normal to the direction of the acceleration so that an acceleration of the patterning device with respect to the support is counteracted by frictional forces occurring at a contact area between the patterning device and the support (Figure 2, pressurizing device 70a-70c), wherein the support is associated with a clamping device which is arranged to subject a second side of the patterning device to at least one second force, at least when the support is accelerated (Figure 2, clamper 63).

Regarding Claims 2, 17 and 25, Sato teaches a lithographic apparatus/method according to claim 1/16/24, wherein the first and second side of the patterning device are situated substantially opposite each other (see Figure 2).

Regarding Claims 3 and 26, Sato teaches a lithographic apparatus/method according to claim 1/24, wherein the clamping device is arranged to provide the at least one second force substantially coinciding with the at least one first force (Figure 2a/b).

Regarding Claims 4 and 27, Sato teaches a lithographic apparatus/method according to claim 1/24, wherein the clamping device is arranged to provide the at least one second force while minimizing areas of contact of which frictional forces can act between the clamping device and the patterning device when the patterning device is accelerated with respect to the clamping device (see part 63 of Figure 3a, where the pole piece touching the substrate with the least amount of contact area).

Regarding Claim 5, Sato teaches a lithographic apparatus according to claim 1, wherein the clamping devices arranged to exert the at least one second force actively (Figure 3a, motor 66 actively puts clamping force on patterning device).

Regarding Claim 6, Sato teaches a lithographic apparatus according to claim 1, wherein the clamping device is arranged to exert the at least one second force passively (Figure 4, spring 72, passively puts clamping force on patterning device, also see paragraph [0014]).

Regarding Claims 7 and 30, Sato teaches a lithographic apparatus/method according to claim 1/24, wherein the clamping device is removable/movable (Figure 3a).

Regarding Claims 10 and 33, Sato teaches a lithographic apparatus/method according to claim 1/24, wherein the clamping device is connected to the support (Figure 3a).

Regarding Claim 16, Sato teaches a support constructed to support a patterning device which is capable of imparting a radiation beam with a pattern in its cross-section to form a patterned radiation beam (Figure 1); wherein the support is arranged to subject, at least when the support is accelerated, a first side of the patterning device to a clamping force (Figure 2) , and wherein the support is associated with a clamping device which is arranged to subject a second side of the patterning device (Figure 2, part 63, on either side), extending in a plane that is non-coinciding with the first side, to an additional clamping force, at least when the support is accelerated (Figure 2, part 63 clamper, on either side).

Regarding Claim 21, Sato teaches a support according to claim 16, wherein said clamping device comprises a resilient structure for providing said additional clamping force by push pressure (Figure 4, spring 72).

Regarding Claim 22, Sato teaches a support according to claim 16, wherein said clamping device comprises a pivoting lever assembly (Figure 3), said lever assembly being pivotable around a pivot (part 62) that is in fixed positional relationship to said support (part 4) and comprising a lever part (part 63) contacting said patterning means so as to provide an additional clamping pressure on said patterning means while being pivoted (Figure 3a, arm is pivoted onto patterning means to provide an additional clamping pressure), and an actuator arranged to pivot said pivoting lever assembly (part 66, motor, discussed in [0027]).

Regarding Claim 23, Sato teaches a support according to claim 16, wherein said clamping device comprises a pivoting lever assembly (Figure 3), said assembly being pivotable around a pivot (Figure 3, part 62) that is in fixed positional relationship to said support (part 4) and comprising a lever part (part 63) contacting said patterning means so as to provide an additional clamping pressure on said patterning means while being pivoted wherein the assembly comprises an inertial mass element, fixedly connected to the pivoting assembly so as to pivot the assembly during accelerations (Figure 3a, part 65).

Regarding Claim 24, Araki et al. teach a device manufacturing method comprising: transferring a pattern from a patterning device onto a substrate wherein the method comprises supporting the patterning device using a support (Figure 1, parts 3/4); accelerating the support (Figure 1, part 3, direction RR); subjecting a first side of the patterning device to at least one first force normal to the direction of the acceleration so that an acceleration of the patterning device with respect to the support is suppressed by frictional forces occurring at a contact area between the patterning device and the support (Figure 2, pressurizing device, 70a-70c); and subjecting a second side of the patterning device to at least one second force normal to the direction of the acceleration of the support, at least when the support is accelerated (Figure 2, clamper 63).

Regarding Claim 28, Sato teaches a method according to claim 24, wherein the method comprises exerting the at least one force actively (Figure 3a/b, 66 motor means are actively providing force).

Regarding Claim 29, Sato teaches a method according to claim 24, wherein the method comprises exerting the at least one force passively (Figure 4, part 72).

Claim 39 is rejected under 35 U.S.C. 102(b) as being anticipated by Araki et al. (USPAPN 2003/0197841).

Regarding Claim 39, Araki et al. teach method comprising: supporting a patterning device using a support (Figure 11, part 218.220); accelerating the support([0135]); subjecting a first side of the patterning device to at least one first force normal to the direction of the acceleration so that an acceleration of the patterning device with respect to the support is suppressed by frictional forces occurring at a contact area between the patterning device and the support ([0128]-[0136], force on left hand side); and subjecting a second side of the patterning device to at least one second force normal to the direction of the acceleration of the support, at least when the support is accelerated (second force, also created from the pressure inside airtight area, on right hand side).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato as applied to claim 16 above and further in view of examiners Official notice of what is known in the art.

Regarding Claim 18, Sato teaches a support according to claim 16.

He fails to explicitly teach wherein the clamping device is connected to said support by clamping elements (clamping device 66 connected to 4, figure 3a).

Clamping the clamping device to the clamping device support with clamping elements would solve the problem of attaching the clamping device to the support.

It would have been obvious to use clamping elements to support the clamping device since the examiner takes official notice that it was known in the art that the clamping device would need to be connected to said support by clamping elements since the support will be accelerating and the friction, which is not sufficient to overcome inertia in the case of the reticle, will also be insufficient to hold the clamping device onto the support. Techniques known in the art include passive techniques, such as screws, cement, glue, solder, forming the support and clamp device monolithically, etc. It would have been obvious to one of ordinary skill that Sato would have to have some form of connection in order to utilize the clamping device in a scan type lithography apparatus/method.

Regarding Claim 19, Sato teaches a support according to claim 18.

He teaches where the reticle actively connects to the support via vacuum suction tubes (Figure 2, 30).

He fails to explicitly state whether said clamping elements comprise vacuum suction tubes.

The clamping elements comprising vacuum suction tubes would solve the problem of easily and securely attaching and detaching the clamp from the support.

Examiner takes official notice that it would have been obvious to use an actively connection between the clamp and the support since active connections are known in the art. Substituting an active support for a passive support would have allowed more control over removal of the clamp or moving of the clamp, and would have yielded predictable results of providing stable support for the clamping device. Additionally, active support would have allowed a better backup system and perhaps more knowledge prior to failure, which could be harder if there was a passive support (such as a screw, which could come loose without the knowledge of the technician, as opposed to a vacuum type support, upon imminent loss of which, the control system could notify the technician).

Regarding Claim 20, Sato teaches a support according to claim 19, wherein the clamping device is shaped to be connected to said support by clamp fitting (Sato, Figure 3a, 4 has a substantially flat surface, 66 is shown to have a substantially flat bottom).

Claims 8, 11 12, 14, 15, 31, 34, 35, 37, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato or Araki et al. as applied to claims 1, 24, and 39 above, and further in view of Araki et al.

Regarding Claims 8 and 31, Sato teaches a lithographic apparatus/method according to claim 7/24,

He teaches where the reticle actively connects to the support (Figure 2, using vacuum pressure 30).

He fails to explicitly state whether the clamping devices is actively or passively connectable to the support.

Ataki et al. also teach various methods for actively connecting the reticle to the supports (magnetic clamps in Figure 15, piezoelectric elements in Figure 26).

Either actively or passively connecting the reticle to the supports would solve the problem of not having an attachment between the reticle and the supports.

It would have been obvious to use an active connection between the clamp and the support since active connections are known in the art. Substituting an active support for a passive support would have allowed more control over removal of the clamp or moving of the clamp, and would have yielded predictable results of providing stable support for the clamping device. Additionally, active support would have allowed a better backup system and perhaps more knowledge prior to failure, which could be harder if there was a passive support (such as a screw, which could come loose without the knowledge of the technician, as opposed to a vacuum type support, upon imminent loss of which, the control system could notify the technician).

Regarding Claims 14 and 37, Sato teaches a lithographic apparatus/method according to claim 1/24.

He fails to teach wherein the clamping device is arranged to abut the support.

Ataki et al. teach wherein the clamping device is arranged to abut the support (Figure 15, where 282 a and 280 share a common boundary).

Arranging the clamping device arranged to abut the support would solve the problem of saving space.

It would have been obvious to modify the invention of Sato in the manner of Ataki et al. to have the clamping device abut the support since this would save space. Modification would yield the predictable result of having the same clamping device taking up less space.

Regarding Claims 11 and 34, Sato teaches a lithographic apparatus/method according to claim 10/33.

Sato fails to explicitly state wherein the clamping device is arranged to dynamically exert the at least one second force when the support is being accelerated.

Araki et al. teach wherein the clamping device is arranged to dynamically exert the at least one second force when the support is being accelerated (8, [0139] and 17, [0243]).

Having the clamping device arranged to dynamically exert the at least one second force during the support acceleration would solve the problem of pieces moving relative to each other, as well as over use of energy.

It would have been obvious to one of ordinary skill to only use the force sufficient to keep the reticle on the reticle holder without excessive force since excessive force can have negative effects on the reticle, as well as consumes more energy than necessary, and is inefficient. Using the minimum amount of energy would yield the predictable results of keeping the reticle stable without wasting energy or affecting the reticle negatively.

Regarding Claims 12 and 35, Sato and Ataki et al. teach a lithographic apparatus/method according to claim 11/34.

Sato fails to explicitly state wherein the clamping device comprises at least one mass which accelerates differently with respect to an acceleration of the support, each mass thereby capable of generating/negating a force that is transmissible for exerting the at least one second force.

Araki et al. teach wherein the clamping device comprises at least one mass which accelerates differently with respect to an acceleration of the support, each mass thereby capable of generating/negating a force that is transmissible for exerting the at least one second force (Figure 22/23, where since the reticle 400 is not directly connected to the holder/clamp of this embodiment of Ataki et al. it would be evident that there could be slight differences in acceleration between the two parts).

Making the lithographic apparatus of Sato and Araki et al. further comprise the clamping device comprising at least one mass which accelerates differently with respect to an acceleration of the support, each mass thereby capable of generating/negating a force that is transmissible for exerting the at least one second force would solve the problem of thermal overheating.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Sato's invention with the spaced apart clamp/holder apparatus of Araki et al. since Araki et al. disclose that this configuration diminishes the thermal contact between 400/410 due to the air flow between the two (from parts 454). This allows "distortion changes caused by the mask warping due to the thermal shape distortion of the mask holder 410, as well as offset and rotation due to mis-positioning of the mask 400" to be "controlled to a satisfactory level, thus enabling accurate and stable projection exposures to be performed," ([0184]). Modification would yield predictable results of allowing less thermal warping and better control.

Regarding Claims 15 and 38, Sato teaches the lithographic apparatus/method according to claim 1/24.

He fails to explicitly state wherein the lithographic apparatus is provided with a handler for handling the patterning device with respect to the support, wherein the handler is also arranged to handle the clamping device.

Araki et al. teach wherein the lithographic apparatus is provided with a handler for handling the patterning device with respect to the support, wherein the handler is also arranged to handle the clamping device (correction unit 550, [0204]).

Attaching a handler for handling the pattering device and the clamping device would solve the problem of how to control these pieces before, during, or after the patterning process.

It would have been obvious to one of ordinary skill in the art to utilize a way to handle both the patterning device and the clamping device through a control system or computation unit since this allows more control over the patterning process, and in the case of Ataki et al., allows quick correction for any detected reticle movement. Modification would have yielded the predictable results of allowing more control and shorter error response time.

Claims 9 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato as applied to claims 1 and 24 above, and further in view of Shiraishi (USPAPN 2005/0068512).

Regarding Claims 9 and 32, Sato teaches a lithographic apparatus according to claim 7.

He fails to explicitly state wherein the clamping device is passively connectable to the support.

Shiraishi teaches where a clamping device is passively connectable to a support (Figure 3, screw B1 connecting clamping device 66 into support 62).

Using the passive clamping device in the lithographic apparatus would solve the problem of unfixed portions of the apparatus.

It would have been obvious to use the passive clamping device of Shiraishi in the invention of Sato since using screws and other passive devices (cements, glues, etc.) are well known in the art and would have yielded the predictable results of fixing the clamping device onto the support and stabilizing the structure.

Claims 13 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato as applied to claims 1 and 24 above, and further in view of Meinel et al. (USPN 4795518).

Regarding Claims 13 and 36, Sato teaches a lithographic apparatus/method according to claim 1.

He fails to explicitly state wherein the clamping device is arranged to provide additional contact area for enhancing the frictional forces needed to overcome to cause acceleration of the patterning device relative to the support when the support is accelerated.

Meinel et al. teach wherein the clamping device is arranged to provide additional contact area for enhancing the frictional forces needed to overcome to cause acceleration of the patterning device relative to the support when the support is accelerated ("the compression increases the contact area between the O ring and the package substrate," abstract).

Increasing the contact space between the lithographic apparatus and reticle would allow more frictional forces to hold the reticle and solve the problem of a sliding reticle.

It would have been obvious to use some sort of elastic O ring to modify the apparatus of Sato so that the more pressure between the reticle and the reticle holder there would have been, the more surface area would have been available to create a surface with friction to prevent the reticle from sliding during movement, since Meinel et al. do the same "to prevent lateral movement of the package substrate relative to the O ring," (abstract) analogous to the problem being solved in Sato's invention ([0003]).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure is noted on the attached notice of references cited.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brooke Purinton whose telephone number is 571.270.5384. The examiner can normally be reached on Monday - Friday 7h30-5h00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on 571.272.2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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